

Finance and Economics Discussion Series

Federal Reserve Board, Washington, D.C.

ISSN 1936-2854 (Print)

ISSN 2767-3898 (Online)

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2022-036

Please cite this paper as:

An, Byeongchan, Robert Bushman, Anya Kleymenova, and Rimmy E. Tomy (2022). "Social Externalities of Bank Enforcement Actions: The Case of Minority Lending," Finance and Economics Discussion Series 2022-036. Washington: Board of Governors of the Federal Reserve System, <https://doi.org/10.17016/FEDS.2022.036>.

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Social Externalities of Bank Enforcement Actions: The Case of Minority Lending^{*}

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April 28, 2022

Abstract

This paper studies the role banking supervision plays in improving access to credit for minorities by investigating how enforcement decisions and orders (EDOs) affect the bank borrower base. We find that, after an EDO's termination, banks significantly increase residential mortgage lending to minorities, relative to white borrowers, even when the enforcement order is not issued for violations of fair lending laws. Our findings suggest that improvements in banks' internal credit assessment and compliance due to the enforcement process are associated with the expansion in lending to minority borrowers. Our findings highlight the indirect social benefits of bank enforcement and supervision.

JEL Classification: G21, G28, G38

Keywords: Banking, Competition, Disclosure, Discrimination, Enforcement actions, Mortgage lending

^{*}We thank C.K. Lee (community banker discussant), Daniel Barth, Matthias Breuer, Hans Christensen, Doug Diamond, Jennifer Dlugosz, Ferdinand Elfers (discussant), João Granja, Sehwa Kim, John Krainer, Benjamin Kay, Dalida Kadyrzhanova, Christian Leuz, Maria Loumiotis, Joe Nichols, Andrea Passalacqua, Matthew Plosser (discussant), Dorian Ruffino, João Santos (discussant), Haresh Sapra, Ishita Sen (discussant), Doug Skinner, Abbie Smith, Shasta Shakya (discussant), Andrew Sutherland (discussant), Chad Syverson, Ana-Maria Tenekedjieva, Harald Uhlig, James Vickery (discussant), James Wang, Teng Wang, Shuang Wu (discussant), Luigi Zingales (discussant), and seminar participants at the University of Chicago Banking Workshop, the Early Insights in Accounting, the Federal Reserve Board, University of North Carolina, Erasmus University Rotterdam, Applied Micro Day Ahead Conference, R&S lunch seminar, 2021 EFMA, 2021 Community Banking in the 21st Century Research and Policy Conference, OIG 2021 Fall Institute Research Conference, NZFM 2021, Paris December Finance Meeting 2021, 2022 AFA Annual Meeting, and 2022 FARS Midyear Meeting for their helpful comments and suggestions. We are grateful to Nobuyuki Furuta, Samuel Shin, and Jizhou Wang for excellent research assistance. We thank James Kiselik for editorial assistance. We gratefully acknowledge the financial support of the Fama-Miller Center for Research in Finance and the University of Chicago Booth School of Business. The views expressed in this study are those of the authors and do not necessarily reflect the views of the Federal Reserve Board or the Federal Reserve System.

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1. Introduction

A central goal of prudential bank supervision is to promote stability and soundness in the financial sector by identifying, controlling, and mitigating risks. Enforcement decisions and orders (EDOs) issued in the wake of formal supervisory interventions are a powerful mechanism that allows bank supervisors to impose specific corrective actions on banks assessed to be following unsafe or unsound practices (Curry et al., 1999; Srinivas et al., 2015; Hirtle et al., 2020). On the one hand, enforcement actions can disrupt a bank’s operations and impose negative externalities on the economy (Peek & Rosengren, 1995; Danisewicz et al., 2018; Roman, 2020). Furthermore, public disclosure of these actions can damage a bank’s reputation and competitively disadvantage it in deposit and lending markets (Delis et al., 2019, 2020; Kleyменова & Tomy, 2022). On the other, remedies imposed by supervisors via EDOs can fundamentally improve banks’ balance sheets, risk management, and lending (Delis et al., 2017; Berger et al., 2021). In this paper, we take a novel perspective and extend the literature by exploring the extent to which corrective actions specified in EDOs generate unintended, positive social externalities in mortgage lending markets.

Specifically, we focus on changes in banks’ borrower bases and investigate whether banks increase their mortgage lending to minority borrowers following the resolution of severe EDOs. We find that mortgage lending to minority borrowers does significantly increase post EDO and that this positive effect increases with the severity of an EDO. We also provide evidence consistent with this increase being driven by corrective actions that result in less reliance on nonprice terms in loan approvals for minority borrowers, improved loan policies, and stronger governance over lending decisions. Interestingly, the effect of these corrective actions is significantly stronger in markets with a greater proportion of subprime borrowers. We find no evidence that this increase in minority lending derives from regulatory capital concerns or EDO-related competitive disadvantage or that it is associated with riskier loans or lower loan quality.

EDOs are issued against financial institutions for violations of laws, rules, or regulations;

unsafe or unsound practices; breaches of fiduciary duty; and other violations. Regulators bring enforcement actions against problem banks as a measure of last resort and exercise some discretion in issuing EDOs. If a bank fails to satisfy the requirements of the order, regulators can enforce the order in U.S. district courts, terminate deposit insurance, or take further actions that might lead to bank closure.¹ Even though regulators could issue enforcement actions after the passage of the Financial Institutions Supervisory Act of 1966 (FISA), enforcement actions only became public knowledge in 1989 after the implementation of the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA). While a few EDOs directly reference fair lending practices, EDOs are generally not concerned with banks' adherence to fair lending laws; fair lending laws are overseen via a separate and distinct supervisory process. Our results are robust to excluding EDOs referencing fair lending.

We consider several channels through which corrective actions imposed by an EDO or reputational damage from public disclosure of supervisory interventions could affect a bank's borrower base generally and minority lending specifically. First, EDOs often force banks to make fundamental operational improvements in their lending processes. For example, they call for changes in loan policies to improve standards for assessing credit risk, to require more extensive internal loan reviews, or to reconfigure the loan committee and redefine the committee members' responsibilities. EDOs can also require the implementation of internal controls that monitor regulatory compliance and internal bank policies. Such changes may increase lending to minorities by limiting the discretion of individual loan officers to practice discrimination in lending decisions.² Innovations in loan policies could also expand the scope

¹Upon completion of the required actions and improved ratings from bank examiners, a termination order is issued. If a bank fails, a formal termination order is issued. If a bank is acquired or merges with another bank, the EDO remains under the original name of the bank and is only terminated once the regulators are satisfied that the new entity has met the requirements of the original order. Sometimes EDOs are modified to include additional conditions or requirements. [Klymenova & Tomy \(2022\)](#) show a schematic example of the FDIC cease and desist (C&D) enforcement order process over time.

²In economics, two types of theoretical models have been proposed for observed discrimination: taste-based (or prejudice-based) and statistical discrimination. In taste-based discrimination models, discrimination is a result of some form of animus toward members of an outside group, resulting in a willingness to pay

of information incorporated into credit risk assessments beyond reliance on metrics like credit scores that may put minority borrowers at a disadvantage.

Second, EDO banks may lend more to minorities to improve their capital ratios. Residential mortgage loans have lower risk weights than unsecured lending. Therefore shifting the loan portfolio toward mortgages and away from unsecured lending increases banks' regulatory capital ratios without the bank having to raise additional equity capital (which may be difficult for banks that have recently received enforcement actions).³ An expansion in residential mortgage lending may only be possible if EDO banks lend to borrowers who have not received mortgage loans. Finally, the disruption caused by an EDO potentially makes affected banks less competitive because it reduces their ability to gather deposits and lend (Danisewicz et al., 2018; Delis et al., 2017; Kleymenova & Tomy, 2022; Peek & Rosengren, 1995). Non-EDO banks might therefore compete away depositors and borrowers from EDO banks, causing the latter to expand lending to previously underserved borrowers, such as minorities.

We begin our analysis by studying changes in EDO banks' lending to minority borrowers in the five years following resolution of the EDO. We provide evidence that EDO banks significantly increase their mortgage lending to minority borrowers following termination of an enforcement order. This result holds whether we define minority borrowers as nonwhite borrowers, or consider lending to Black or African-American borrowers relative to white male borrowers. The share of residential mortgage lending to minority borrowers in EDO banks' total residential mortgage portfolio increases by 3% to 5% after EDO termination. An important concern in this analysis is that changes in the economy, other than the enforcement process itself, that affect all banks could be driving the increase in lending to minorities.

To address this concern, we study changes in the market shares of EDO banks in the

a price to avoid interactions with members of this group. In statistical discrimination models, discrimination takes the form of stereotyping based on group membership due to imperfect information (see Guryan & Charles (2013) for a detailed discussion and summary of the literature).

³Studies have documented that banks optimize their portfolios within risk-weight allocations. For example, see Aiyar et al. (2014); Duchin & Sosyura (2014); Jiménez et al. (2017); Uluc & Wieladek (2018).

counties where they operate. Specifically, we find that EDO banks increase their market shares of the total lending to minorities by all banks in a given county following EDO termination. Relative to the pre-EDO period, the market share of mortgage lending to minorities increases by 1.1%. On average, EDO banks' market share of lending to minorities in the residential mortgage market is 0.41%, making the increase economically significant. Because market share encompasses all banks' lending to minorities in a county, our approach allays concerns that general economic trends could drive our findings for EDO banks. As a robustness check, we study changes in EDO banks' lending, relative to a matched control sample of non-EDO banks, and find consistent results. Furthermore, as EDOs are staggered in time and vary by geography, they provide variation that allows us to tie the increase in lending to minorities to enforcement actions. We also control for bank-specific characteristics and county-level employment growth and include year and bank effects to control for any unobserved heterogeneity due to macroeconomic conditions and time-invariant bank characteristics. Overall, our results indicate that, relative to non-EDO banks (all non-EDO banks and a matched sample) operating in the same county, EDO banks significantly expand their lending to minority borrowers.

To gain insight into the underlying reasons for this increase in minority lending, we first examine changes in the type of loans rejected. In our sample, banks deny 34.5% of all mortgage loan applications from minorities. The corresponding denial rate for white borrowers is 22.4%. In our analyses we find that, minority borrowers are 11% more likely to be denied a mortgage loan than white borrowers before an EDO. However, following EDO termination, we find that the relative denial rate decreases by 6 percentage points for minority borrowers. Consistent with fundamental changes in loan policies and credit assessments, the decline in rejection rates for minority applicants spans the full range of mortgage lending, including loans for owner-occupied homes, refinancing, investment properties, and home improvement.

We next consider reasons for denying the mortgage loan applications of minority borrow-

ers. We find that, relative to the pre-EDO period, applications from minority borrowers are 0.86% less likely to be rejected due to their credit histories after EDO termination. Banks have used nonprice terms, such as credit history, collateral, and debt-to-income ratios to ration credit (Stiglitz & Weiss, 1981). Minority borrowers are more likely to be constrained by these nonprice terms because they are also more likely to have lower wealth (Bostic, 1997; Gyourko et al., 1999; Acolin et al., 2016). Our result shows that banks rely less on nonprice terms in determining whether to reject loan applications from minorities following EDO termination. Lower reliance on nonprice terms is consistent with EDOs forcing corrective actions that improve loan policies and credit assessment processes that benefit minority borrowers. Bolstering this interpretation, we find no evidence that this increase in minority lending is accompanied by a deterioration in loan portfolio quality.

To more directly explore the idea that these increases in minority lending result from fundamental improvements in lending processes, we extract textured information from the textual content of EDOs. Specifically, we create two variables to reflect process improvements related to credit assessment. The first variable captures whether the enforcement order requires revising or establishing a written loan policy. The second captures whether the order requires the bank to develop written internal audit procedures.

We find that increases in minority lending are significantly higher for EDOs that specify the revision of loan policies and or the implementation of more formal internal governance procedures in counties with a higher proportion of subprime borrowers. Furthermore, we find that banks with more severe EDOs and banks with stricter regulators increase their minority lending more after EDOs. This result is consistent with these banks improving their operations more than banks with less severe EDOs or with more lenient regulators. Finally, we do not find that banks expand residential mortgage lending to minority borrowers to improve their capital ratios or that an increase in competition from non-EDO banks drives EDO banks to lend more to minority borrowers. Overall, we provide robust evidence that banks increase lending to minority borrowers following the resolution of EDOs, and that this

increase is consistent with corrective actions that improve the banks’ internal processes and thus facilitate profitable lending to minority borrowers.

Our paper contributes to two main streams of the literature. First, we contribute to the work on bank supervision and enforcement by exploring the impact of EDOs on banks’ borrower bases (Flannery, 1998; Granja & Leuz, 2019; Passalacqua et al., 2019; Hirtle et al., 2020; Berger et al., 2021). Although research has studied the causes and consequences of bank enforcement actions (Delis et al., 2017; Danisewicz et al., 2018; Kleymenova & Tomy, 2022), and the impact of EDOs on syndicated lending by banks (Roman et al., 2016; Delis et al., 2020), to the best of our knowledge, we are the first to investigate the effect of the supervisory enforcement process on changes in banks’ borrower bases and to study the channels through which it manifests.

Second, we contribute to the literature on mortgage lending to minority borrowers. A large body of work in this area finds disparities in credit access. However, this literature has not reached a consensus on whether non-economic factors, such as race and gender, influence lenders’ decisions to extend credit (Holmes & Horvitz, 1994; Munnell et al., 1996; Horne, 1997; Blanchflower et al., 2003; Asiedu et al., 2012). Our findings suggest that the bank enforcement results in greater access to lending for minority communities through improvements in banks’ internal operations, even when the enforcement action is not issued for violations of fair lending laws. Our work has policy implications for the enforcement of fair lending laws, which have tended to rely on outcome-based measures (e.g., the share of lending to minorities in a local market (Walter, 1995)). We emphasize the need to consider process improvements within banks as a critical factor in enhancing the access to credit for minority borrowers.

2. Data and sample

Our data come from various sources. We identify all enforcement actions issued by bank regulators starting from 1997 using the S&P Global SNL Financial database. Several types

of enforcement actions exist and they vary by degree of severity. Similar to other research using EDOs (Delis et al., 2017; Kleyменова & Tomy, 2022), we restrict our analyses to the most common and severe EDO types that require banks to take corrective actions: cease and desist (C&D) orders, formal or supervisory agreements, consent orders and prompt corrective action (PCA) orders. C&D orders are enforceable, injunction-type orders that may be issued to a bank when it engages, has engaged, or is about to engage in an unsafe or unsound banking practice or violation of the law. Formal agreements prescribe restrictions and remedies that banks must take to return to a safe and sound condition. PCA orders require banks to take measures to protect or raise the level of their regulatory capital. Our main sample consists of 1,350 unique severe EDOs issued by all federal bank regulators for years 1997 to 2013, and we use the first EDO that a bank receives.⁴ Our analyses focus on the three years before an EDO is received, the period when a bank is subject to the EDO, and five years that follow the EDO’s termination.⁵

We focus our empirical analyses on commercial banks and obtain their financial data from the Federal Financial Institutions Examination Council (FFIEC) call reports. Table 1, Panel A shows the summary statistics for our sample of EDO banks using quarterly call report data. On average, 65.3% of EDO banks’ assets are in total loans. Commercial and industrial (C&I) loans represent 10.3% of banks’ total assets, mortgages represent 47.4% of total assets on average (of which commercial mortgages represent 10.2% of total assets and residential mortgages represent 17.9% of total assets on average). Total loans are on average 78.6% funded by deposits.

For our main analyses of residential loan mortgage portfolios and their composition,

⁴Among the 1,350 EDO banks in our sample, 981 have only one EDO; 293 have two; 67 have three; seven have four; and only two banks have five. In our sample, C&D orders are the most common with 769 EDOs, followed by formal agreements and consent orders (537) and PCA orders (44). We use EDOs from the Federal Deposit Insurance Corp. (FDIC), the Federal Reserve System, and the Office of the Comptroller of the Currency (OCC).

⁵We start our sample in 1997 so that the three-year pre-EDO period begins in 1994 when the Summary of Deposits data begins. We stop our EDO sample in 2013 so that the post-termination period is five years for all EDO banks.

we use the Home Mortgage Disclosure Act (HMDA) data that provides transaction-level disclosure of residential mortgage loan applications and underwritten loans as well as reasons for denial of an application. These data are available annually. [Table 1, Panel A](#) also shows that the percentage market share of residential mortgage lending to minorities in a given county is 0.41%. [Table 1, Panel B](#) shows the breakdown of the number of loans originated and the number of applications denied by applicants’ race and gender and loan type and purpose. On average, EDO banks deny 33.8% of all applications. However, minority and female borrowers represent a smaller portion of originated loans and a higher portion of denials (34.5% for minorities and 28.4% for females). We use the reported race and gender of the primary applicant and define minority borrowers as applicants whose race was specified in the loan disclosure documents as nonwhite.⁶ As can be seen from [Panel B of Table 1](#), the majority of originated loans are for nonminority and male borrowers. We winsorize all of the continuous variables at the the 1% and 99% tails of their respective distributions in each sample year and provide detailed definitions of all variables used in our analyses in [Appendix A](#).

3. EDO banks’ loans to minority borrowers

We begin our analyses by exploring changes in lending to minorities for EDO banks. Specifically, we estimate variations of the following model.

$$\begin{aligned} Portfolio\ shares_{itc} = & \beta_0 + \beta_1 During\ EDO_{it} + \beta_2 Post\ EDO_{it} + \gamma X_{i(t-1)c} \\ & + \alpha_i + \delta_t + \eta_c + \epsilon_{itc}, \end{aligned} \tag{1}$$

where i indexes the bank, t the year, and c the county. The dependent variable, *Portfolio shares*, represents residential mortgage loans to minorities as a share of banks’ total resi-

⁶Minorities are defined as reporting the following races on the application: American Indian or Alaska Native, Asian, Black or African American, or Native Hawaiian or Other Pacific Islander. Nonwhite hispanics are also included in this definition. Among originated loans, 12.7% do not report race, and 9.2% do not report gender.

dential mortgage loans at the bank-county level. *During EDO* is an indicator that equals one for the period an EDO is in effect and zero otherwise; *Post EDO* is an indicator that equals one for the five years after the termination of the EDO and zero otherwise; X is a vector of lagged control variables, and includes size, profitability, liquidity, capital ratio, nonperforming assets, and county-level employment growth as a control for local economic conditions; and α_i , δ_t and η_c are bank, year, and county effects, respectively. The benchmark period is three years prior to the issuance of the EDO. We only retain data for EDO banks for the benchmark period, the duration of the EDO, and five years after the termination of the EDO. We apply this restriction in all of our specifications. If EDO banks increase their portfolio share of lending to minorities following EDO termination, we expect β_2 to be positive and significant.

The dependent variable (*Portfolio shares*) contains many zero values because banks do not lend to minorities in all counties where they operate.⁷ The literature has used Tobit models to analyze data in cases where the dependent variable has many zeros. For example, [Yermack \(1995\)](#) uses a Tobit specification to analyze CEO stock option awards because, in close to 45% of firm-years, there is no CEO stock option award resulting in a mass of observations at zero. [Rosen & Wu \(2004\)](#) model the portfolio shares of investment in certain asset classes using a random-effects Tobit estimator. [Poterba & Samwick \(2003\)](#) also use a Tobit specification to model portfolio shares of financial assets held by households.⁸ Following the literature, we estimate [Equation 1](#) using a Tobit regression model ([Tobin, 1958](#); [Boulton & Williford, 2018](#); [Keele & Miratrix, 2019](#)).

We present our results from this estimation in [Table 2](#). The sample includes all counties where EDO banks make residential mortgage loans. Column (1) shows that the share of res-

⁷As can be seen in [Table OA1](#) of the online appendix, EDO banks lend to minorities in only 29% (6/21) of the counties where they are active during the EDO. This figure increases to 35% (11/31) in the five years after EDO termination.

⁸For other examples of studies that use a random effects Tobit specification, please see [Borokhovich et al. \(2000\)](#); [Haigh & List \(2005\)](#); [Edwards \(2008\)](#) and [Chay & Suh \(2009\)](#). Also, a Tobit specification assumes that the zero and positive observations are generated by the same mechanism ([Silva et al., 2015](#)).

idential mortgage loans to minorities in banks’ total residential mortgage portfolio increases by 3% following EDO termination. While column (1) shows changes in the portfolio shares for all minority borrowers, column (2) focuses on Black or African American borrowers. Consistent with the result for all minorities, EDO banks increase their portfolio shares of residential mortgage loans to Black or African American borrowers by 2.7% following EDO termination. Column (3) presents the results for portfolio shares of loans to Black or African American borrowers, relative to white males, and shows a 5% increase in lending to this group, following the termination of the enforcement action.

We next assess whether the increase in lending to minorities is driven by underlying local economic conditions or other changes that affect all commercial banks, including those that did not receive an EDO. We follow several approaches to compare EDO banks to non-EDO banks. In our main analysis, we study changes in the market shares of residential mortgage loans to minorities. Specifically, we create a variable *Market shares*, which is loans to minority borrowers granted by EDO banks as a share of total loans to minority borrowers made by all banks in a given county. We reestimate [Equation 1](#) using *Market shares* as the dependent variable. This approach allows us to estimate changes in lending to minorities by EDO banks, relative to *all other banks* operating in a county.⁹ As before, given many zeros in *Market shares*, we employ a Tobit regression model in our estimations.

[Table 2](#), column (4), presents the results. The sample in this table includes all counties with mortgage lending to minorities. The table shows that EDO banks significantly expand lending to minorities in the years following EDO termination. Relative to the pre-EDO period, the market share in mortgage lending to minorities increases by 1.05%. On average, as reported in [Panel A](#) of [Table 1](#), EDO banks have a market share of 0.41% in mortgage

⁹An alternative approach to account for local economic conditions is to use transaction-level data and county \times year fixed effects ([Buchak et al., 2018](#); [Fuster et al., 2019](#)). A drawback of this approach in our setting is that multiple banks in a county could receive EDOs, which may overlap, resulting in all transactions of non-EDO banks (at the county level) being repeated multiple times in the dataset, quickly inflating our sample. Therefore we believe that a market shares approach is a better-suited and clearer way to account for changes in local economic conditions in our setting.

lending to minorities over our sample period, suggesting that the changes in market shares are economically significant. In column (5), *Market shares* is redefined to include only Black or African American borrowers. The column shows that EDO banks' market shares of loans to Black or African American borrowers increases by 1.1% following the termination of the enforcement action. These results mitigate concerns that macroeconomic changes in the local market could have driven the increase in lending to minorities by EDO banks because, relative to non-EDO banks operating in the county, EDO banks disproportionately expand their lending to minority communities. One concern with the market share analysis is that the counties are equally weighted, which may overweight smaller counties and obscure the economic significance. Therefore, as a robustness check, we weight our regressions by county size using county-level population. Results from this estimation are presented in [Table OA2](#) of the online appendix and show that our inferences continue to hold.

In additional analysis, we follow a different approach to control for general changes in the local economy that may affect all banks and not only EDO banks. Specifically, we create a control sample of non-EDO banks, matched on size and geography (county), and estimate the following specification.

$$\begin{aligned}
Portfolio\ shares_{itc} = & \beta_0 + \beta_1 During\ EDO_{it} + \beta_2 Post\ EDO_{it} \\
& + \beta_3 During\ EDO_{it} \times Treatment_i + \beta_4 Post\ EDO_{it} \times Treatment_i \quad (2) \\
& + \gamma X_{i(t-1)c} + \alpha_i + \delta_t + \eta_c + \epsilon_{itc},
\end{aligned}$$

where *Treatment* is an indicator that takes the value of 1 for EDO banks and 0 otherwise. The remaining variables are as defined before. If EDO banks increase lending to minorities following EDO termination, we expect β_4 to be positive and significant. Results from estimating [Equation 2](#) are presented in [Table OA3](#) of the online appendix, and, consistent with our main results, they show that EDO banks increase lending to minorities, relative to the matched sample of control banks.

Our findings in this section, combined with the fact that EDOs are staggered in time

and by geography, allow us to tie the increase in lending to minorities to the enforcement actions. To further support our findings of increased mortgage lending to minorities due to enforcement, we explore changes in denials of residential mortgage applications next.

4. Changes in mortgage application denials for minorities

We evaluate changes in denials by loan purpose and the reasons for denying an application from minorities, relative to white borrowers. Because banks could deny different loan application types and provide various reasons for denial with no clear ordering, we use a multinomial logistic regression to model banks' choices. Using a multinomial logistic model also allows us to simultaneously estimate the loan types and reasons for denial. In particular, we estimate the probability that a bank i takes an action ϕ as follows.

$$Pr(Y_i = \phi) = \frac{\exp(\beta_\phi X_i)}{\sum_{\phi=1}^k \exp(\beta_k X_i)} , \text{ for } \phi = 1, \dots, k , \quad (3)$$

where ϕ represents the action that a bank does not deny the loan or denies a loan of a specified type or for a specified reason. X represents a vector of variables including *Minority*, *During EDO*, and *Post EDO* indicators and the interaction of *Minority* with these indicators. *Minority* is an indicator taking the value of one if an application is by a minority borrower and zero otherwise. X also includes lagged bank- and county-specific control variables and year fixed effects. The control variables are size, profitability, liquidity, capital ratio, nonperforming assets, and county-level employment growth.

In our first set of tests, ϕ represents denial by loan type. Relative to a baseline of no denial, we define mutually exclusive categories based on whether the home is owner occupied (primary home for the borrower) or non-owner-occupied (an investment property) and whether the purpose of the loan is a home purchase, home improvement, or refinancing.

Table 3, Panel A presents the results from this estimation. For ease of interpretation, we suppress coefficient estimates and report only marginal effects. Consistent with prior studies (Black et al., 1978; Duca & Rosenthal, 1993; Munnell et al., 1996; Wheeler & Olson, 2015),

the marginal effect of *Minority* in column (1) indicates that minorities are more likely to be denied loans, relative to white borrowers. Furthermore, the denial likelihood is consistently higher for minorities across all but one loan type (refinancing loans for non-owner-occupied properties), for which it is the same as for white borrowers. However, following EDO termination, banks are *less* likely to deny loan applications from minority borrowers. (column (1) shows the marginal effect for “No Denial” is 6.4%.) This decline in denials includes loans for refinancing, home purchase, and home improvement for owner-occupied properties, for which denials decrease by 2.3%, 1.8%, and 1.5%, respectively. The likelihood of denial also decreases for non-owner-occupied home purchase loans (-0.73%). These results indicate that the decline in mortgage application rejections for minority applicants spans all loan types and is not concentrated in a specific loan type.

Next we reestimate [Equation 3](#) while focusing on the reasons for denying a mortgage loan application. Banks can choose to accept or deny a loan application for various reasons, which may change following an enforcement action. Relative to a baseline of no denial, we define mutually exclusive categories based on the reasons for denial specified by EDO banks. These include a high debt-to-income ratio, poor credit history, lack of collateral, information reasons (including denials due to unverifiable information or incomplete credit applications), and a residual category “Other.” While there are multiple reasons for denying a loan, we focus on those that appear more frequently in our sample. In our sample of mortgage loan applications, 33.8% get denied ([Table 1, Panel B](#)). The denial rate due to lack of collateral is 32.2%, poor credit history is 17.8%, a high debt-to-income ratio is 8.4%, and information reasons is 8.0% (untabulated). The residual category (33.6%) includes all loan applications for which a reason for denial is not specified, appears infrequently, or where banks give multiple reasons for denial.¹⁰

Mortgage application requirements, such as collateral, credit history, and debt-to-income

¹⁰In the residual category, 31.9% of all denials are due to unspecified reasons. The reasons for denial that appear infrequently include employment history, insufficient cash, or denial of mortgage insurance.

ratios, are nonprice terms that lenders use to ration credit (Stiglitz & Weiss, 1981) and to limit moral hazard or adverse selection. Borrowers who do not meet the thresholds for these terms may not receive credit, even if they are willing to pay higher interest rates. Minority borrowers are more likely to be constrained by nonprice terms because they are more likely to have lower wealth (Bostic, 1997; Gyourko et al., 1999; Acolin et al., 2016). For example, Bostic (1997) finds that minority applicants are rejected more often if debt-to-income ratios are used in credit assessment because they have lower incomes and are therefore prone to default in case of income shocks.

Table 3, Panel B presents marginal effects from the estimation of Equation 3 and indicates that, following EDO termination, minorities are 0.86% less likely to be denied a loan due to their credit history. This suggests banks potentially change their credit assessment processes to rely less on nonprice terms following an enforcement action. They may also use additional sources of information to assess borrowers' creditworthiness, as opposed to relying solely on their credit scores. We also find that minority borrowers are less likely to be denied a loan due to other reasons (−4.66%). This category primarily includes denials where the bank does not specify the reason for denial or if it specifies multiple reasons.

We conduct several additional tests to assess the robustness of our results. An advantage of using a multinomial logit specification is that it allows us to simultaneously estimate the reasons for denial and study the relative importance of these reasons. However, this specification requires us to create mutually exclusive categories based on the primary reason for denial. Banks could also specify multiple reasons for denial, and reasons could appear with a low frequency, both of which are captured in the residual “Other” category. Therefore, to assess the consistency of our results, we consider denials with multiple reasons as well as

low-frequency categories and estimate the following OLS model.

$$\begin{aligned}
Denial_{it} = & \beta_0 + \beta_1 During\ EDO_{it} + \beta_2 Post\ EDO_{it} + \beta_3 Minority_i \\
& + \beta_4 During\ EDO_{it} \times Minority_i + \beta_5 Post\ EDO_{it} \times Minority_i \\
& + \gamma X_{i(t-1)c} + \delta_t + \alpha_i \times \eta_c + \epsilon_{itc},
\end{aligned} \tag{4}$$

where *Denial* is an indicator variable if a loan application is denied for the specified reason. The remaining variables are as described before. In this estimation, we include year and bank \times county fixed effects and therefore account for local economic conditions faced by the same bank lending in different counties.¹¹ Results from the estimation of [Equation 4](#) are presented in [Table OA4](#) of the online appendix and indicate that our main inferences continue to hold. Specifically, we find that, relative to white borrowers, loan denials for minority borrowers decline by 5% following EDO termination. Much of this decline appears to be driven by lower denials due to credit history (a nonprice term). EDO banks are 3.4% less likely to deny loans to minorities, relative to white borrowers, due to their credit history following EDO termination.

Our results thus far show that EDO banks are less likely to reject loans from minorities, relative to white borrowers, due to nonprice terms such as credit history, following the termination of an enforcement action. The lack of a strong credit history is reflected in borrowers' credit scores. For example, FICO scores consider various aspects of individuals' credit history—the length of their credit history as well as how long they have gone without negative credit events, such as bankruptcies, foreclosures, or delinquencies.¹² Building a credit history requires access to a line of credit, which minority borrowers may find harder to get because they are likely to have less wealth than white borrowers. Minority borrowers are also more likely to face income shocks and therefore negative credit events. If, following

¹¹We also estimate [Equation 4](#) by including year, bank, and county fixed effects separately and find consistent results (untabulated).

¹²A FICO score is a credit score created by the Fair Isaac Corporation.

enforcement actions, EDO banks can better process and use alternative sources of information, they may rely less on credit scores to make lending decisions.¹³ Therefore the decline in denials should be concentrated among borrowers with low credit scores.

To test this explanation, we create a subprime indicator (*Subprime*), using FICO scores for originated loans from Corelogic’s Loan-Level Market Analytics dataset. We calculate average FICO scores from the Corelogic dataset at the level of the census tract, loan origination year, loan type, loan purpose, and occupancy status of the property. Based on these characteristics, we merge the average FICO scores with the transactions in our sample. *Subprime* takes a value of 1 if the average transaction-matched FICO score is 619 or below and 0 otherwise.¹⁴ We lose 9% of our sample by including the subprime measure because the Corelogic data does not cover all census tracts for which we have transaction-level data from HMDA. Our results (presented in Table OA5 of the online appendix) indicate that minority borrowers in subprime regions are 5.4% less likely to be denied a mortgage loan application based on nonprice terms, such as collateral requirements. These results are consistent with EDO banks’ improving their credit assessment procedures and becoming more discerning.

Our analyses offer insights into why lending to minorities increases following EDO termination. We find that EDO banks are less likely to deny loans to minority applicants based on nonprice terms, indicating changes in credit assessment procedures. Reduced reliance on nonprice terms, such as collateral requirements and credit histories, disproportionately affects lending to minorities because this category of borrowers is more likely to be constrained by such terms (Bostic, 1997; Gyourko et al., 1999; Acolin et al., 2016). In Section 6, we further explore potential mechanisms to explain the increase in lending to minorities following EDO termination.

¹³Examples of alternative sources of information banks could use include utility payments, rental histories, and remittance histories (Brevoort et al., 2016; Schneider & Schutte, 2007).

¹⁴Our definition of subprime is based on Keys et al. (2010). In additional robustness tests, we define *Subprime* as FICO scores of 669 and below and find consistent results.

5. Changes in risk

We next investigate whether increased lending to minority borrowers is associated with a rise in risky lending along several measures of risk, including nonperforming assets and the market share of risky loans. If EDO banks were to increase lending to less creditworthy customers, such an increase would result in higher nonperforming assets. Accordingly, we study the changes in EDO banks' nonperforming assets in the years following EDO termination, relative to the pre-EDO period, by estimating the following model.

$$NPA_{it} = \beta_0 + \beta_1 \textit{During EDO}_{it} + \beta_2 \textit{Post EDO}_{it} + \gamma X_{it-1} + \alpha_i + \delta_t + \epsilon_{it}, \quad (5)$$

where NPA is the total and residential nonperforming assets scaled by total loans. The remaining variables are as defined before.

Table 4, Panel A, presents our findings from estimating Equation 5. Columns (1) and (2) show changes in total nonperforming assets during and following the termination of an EDO, relative to the period prior to the EDO. Column (1) does not include bank-level controls while column (2) does. Total nonperforming assets increase during an EDO, consistent with regulators inducing banks to recognize previously hidden nonperforming loans. However, nonperforming assets revert to their pre-EDO levels following EDO termination. In column (3), the dependent variable is nonperforming assets for residential mortgages. Due to data restrictions, we can only analyze NPAs for residential mortgages starting from 2001. Consistent with the results for total nonperforming assets, column (3) shows that NPAs for residential mortgages do not increase following EDO termination. Overall these findings suggest that EDO banks do not witness an increase in their nonperforming assets in the years following EDO termination.

We also study changes in the market shares of risky mortgage loans originated by EDO banks at the county level. We reestimate Equation 5, where the dependent variable (*Market shares of risky loans*) is defined as EDO banks' share of higher-priced, closed-end mortgages

as a percentage of total such residential mortgage loans made by all commercial banks at the county level.¹⁵ Given data limitations, this analysis starts from 2004. Panel B of Table 4 presents these results. Column (1) of the table includes the full sample, whereas column (2) uses the sample conditional on whether the EDO bank makes at least one such risky loan in the county. The dependent variable in column (1) consists of many zeros because EDO banks do not make such loans in all counties where they operate. Accordingly, we use a Tobit specification in estimating column (1). The dependent variable in column (2) contains only positive values for the market share of risky loans. Therefore we estimate column (2) using OLS. Our results indicate a decrease or no change in the market shares of risky loans following EDO termination, suggesting that the increase in lending to minority borrowers is not associated with an increase in risky lending.

Finally, we study whether loans to minority borrowers following EDO termination are securitized or remain on banks' balance sheets. Because originating banks do not bear the full risk of defaults on securitized loans, their incentives to screen and monitor borrowers may diminish (Diamond & Rajan, 2001; Keys et al., 2010; Wang & Xia, 2014). We present our findings related to the securitization status of EDO banks' loans to minority borrowers in Table 4, Panel C, columns (1) and (2). The dependent variable in column (1) is EDO banks' unsecuritized mortgage loans to minority borrowers scaled by their loans to all borrowers. Similarly, the dependent variable in column (2) is EDO banks' securitized mortgage loans to minority borrowers scaled by their loans to all borrowers. These results indicate that the increase in loans to minority borrowers following EDO termination is driven by securitized loans. However, these results do not necessarily imply that banks originated riskier loans following EDO termination. To establish that these securitized loans are not riskier, we test whether the originated loans were sold to government-sponsored enterprises (GSEs). GSEs are not permitted to lend to risky borrowers and therefore do not purchase loans where

¹⁵Loans are classified as higher priced if the annual percentage rate (APR) exceeds the average prime offer rate (APOR) for loans of a similar type by at least 1.5 percentage points for first-lien loans or 3.5 percentage points for junior-lien loans.

borrowers' FICO scores are less than 620 ([Keys et al., 2010](#)). To assess whether the increase in lending to minority borrowers is driven by risky loans, in columns (3) and (4), we study whether the securitized loans were sold to non-GSEs or GSEs. In column (3), the dependent variable is EDO banks' mortgage loans to minority borrowers that are sold to non-GSEs scaled by their loans to all borrowers. Similarly, the dependent variable in column (4) is EDO banks' mortgage loans to minority borrowers that are sold to GSEs scaled by their loans to all borrowers. The results in these two columns indicate that loans to minorities are driven by loans securitized by GSEs, suggesting that the increase in lending to minority borrowers is not driven by risky borrowers.

6. Potential mechanisms

Next we investigate several potential mechanisms for the increase in lending to minorities following EDO termination. First, the enforcement action might have resulted in process improvements at EDO banks. Second, EDO banks may have expanded residential mortgage lending to improve their capital ratios, and this expansion would only be possible by lending to previously underserved borrowers. Finally, increased competition from non-EDO banks may have resulted in EDO banks expanding their lending to minority borrowers. Overall, we find evidence consistent with improvements at EDO banks due to the enforcement process driving the increase in lending to minority borrowers.

6.1. Improvements at EDO banks due to enforcement

Several of our findings thus far suggest that enforcement actions lead to process improvements at EDO banks. First, our results in [Section 4](#) that EDO banks are less likely to deny credit to minority borrowers based on nonprice terms indicate changes in banks' credit assessment procedures following EDO termination. Second, as discussed in [Section 5](#), EDO banks witness a reduction or no change in the riskiness of their loan portfolios, further suggesting improvements in credit assessment. Finally, EDO banks' loans to minorities are sold to GSEs, which do not purchase higher risk loans. This further suggests that the increase

in lending to minorities is not driven by an increase in the riskiness of loans. We conduct additional analyses to assess whether process improvements at EDO banks drive the increase in lending to minorities.

Based on the textual content of enforcement orders, we identify EDOs that explicitly require a bank to establish or revise a written loan policy or develop written internal audit procedures. A loan policy may specify standards for assessing credit risk, require an internal review of loans, establish a loan committee and spell out the committee members' responsibilities. Internal audit procedures may require compliance with applicable statutes and regulations and with policies prescribed by the management or board.¹⁶ Such changes limit the discretion allowed to individual loan officers and could lead to an increase in lending to minorities, if the discretion was associated with prejudice-based (taste) or statistical discrimination. Changes in loan policy could also affect credit assessment, as they may allow EDO banks to better analyze alternative sources of information to assess credit risk and thereby reduce their reliance on a single metric, such as a credit score. Minority borrowers are more likely to be denied based on credit scores because they tend to have lower wealth and are more prone to income shocks. These factors impede their ability to build a strong credit history, which is an important determinant of credit scores.

To study the impact of process improvements due to the enforcement order on EDO banks' propensity to lend to minority borrowers, we estimate variations of the following model.

$$\begin{aligned}
Portfolio\ shares_{itc} = & \beta_0 + \beta_1 During\ EDO_{it} + \beta_2 Post\ EDO_{it} + \beta_3 Treatment_i \\
& + \beta_4 During\ EDO_{it} \times Treatment_i + \beta_5 Post\ EDO_{it} \times Treatment_i \quad (6) \\
& + \gamma X_{it-1} + \alpha_i + \delta_t + \eta_c + \epsilon_{itc},
\end{aligned}$$

where *Treatment* represents variables associated with greater improvements in internal pro-

¹⁶In [Appendix B.2](#) of the online appendix, we provide excerpts from an enforcement order that required changes in loan policy and internal audit.

cesses following the receipt of an enforcement action. The remaining variables are as defined before. Based on our analysis of the textual content of enforcement actions, we create two variables to reflect process improvements related to credit assessment. The first, *Loan policy*, is an indicator for whether the enforcement order requires revising or establishing a written loan policy. The second, *Internal audit*, is an indicator if the order requires the bank to develop written internal audit procedures.

Column (1) of [Panel A](#) of [Table 5](#) shows no change in the portfolio share of loans to minorities following EDO termination for enforcement orders that require a written loan policy. However, in column (2), we interact $Post\ EDO \times Treatment$ with *Subprime share*, which is the percentage of borrowers in the county with FICO scores of 619 or below.¹⁷ The results in column (2) indicate that loan policy-related improvements are associated with an increase in lending to minority borrowers located in regions with a greater share of low credit scores. Specifically, the pertinent banks expand their portfolio shares of lending to minorities by 71%. This result is consistent with EDO banks using additional sources of information to assess credit risk.

We find similar results based on our second measure of process improvements, that is, whether the enforcement order required written internal audit procedures. These results are presented in columns (3) and (4) of [Table 5, Panel A](#). Column (4) shows that EDO banks that had to implement written internal audit procedures increased lending to minorities by 94% in counties with a greater share of low credit scores.

In further tests, we assess the differential lending of banks likely to have improved significantly due to enforcement, relative to the period prior to receiving the enforcement action. In our first set of tests, we re-estimate [Equation 6](#) with *Treatment* representing the strictness of the regulator. We expect that EDO banks in states with stricter regulators are likely

¹⁷We source FICO scores from the Corelogic Loan-Level Market Analytics dataset. We aggregate the loan origination data to the ZIP code and origination year level. We then convert ZIP-code-level FICO scores to the county level by using a crosswalk file from the Department of Housing and Urban Development, which contains the fraction of all addresses in a given ZIP code that belong to a county.

to improve more as a result of enforcement. We use the measure developed by [Agarwal et al. \(2014\)](#), who find that, due to institutional differences, varying incentives, and resource constraints, state and federal banking regulators are inconsistent in implementing the same supervisory rules. Specifically, based on regulatory ratings, [Agarwal et al. \(2014\)](#) find that federal regulators are generally stricter than state regulators and there is variation across states in their level of strictness. Although this measure pertains to state regulators, federal and state regulators collaborate in issuing enforcement actions to state-chartered banks.

We present our results from this analysis in column (1) of [Table 5, Panel B](#). The sample only includes state-chartered banks, as the [Agarwal et al. \(2014\)](#) measure applies only to state-chartered banks by construction. Our results indicate that EDO banks with stricter regulators expand their portfolio shares of lending to minorities by 8.5% following EDO termination.

Next we estimate [Equation 6](#) with *Treatment* representing the severity of the enforcement action, measured as the length of time it takes a bank to exit an EDO from its issuance to resolution. Banks with more severe enforcement actions have problems on several fronts that must be resolved before the regulator will terminate the enforcement action. Therefore EDO banks with more severe enforcement actions are more likely to improve their operations following EDO termination, relative to the pre-EDO period. Column (2) of [Table 5](#) shows that banks with more severe EDOs significantly increase lending to minorities after the EDO. Specifically, for these banks, lending to minorities increases by 3.3% following EDO termination. Overall, our findings suggest that improvements of banks' operations due to enforcement is associated with an increase in lending to minorities.

6.2. Improving capital ratios

Because secured loans have relatively lower risk weights, EDO banks could increase their capital ratio by expanding residential mortgage lending. However, an increase in this kind of lending may only be possible if EDO banks expand lending to previously underserved categories of borrowers, such as minorities. To test this hypothesis, we re-estimate [Equation 6](#)

where *Treatment* represents low capital, measured as an indicator for EDO banks in the lowest tercile of regulatory capital in the period prior to receiving an EDO. We present our findings from this estimation in column (1) of [Table 6](#). The results do not provide consistent evidence to suggest that EDO banks expand lending to minorities to manage their capital.

6.3. Competition from non-EDO banks

Next we assess whether competition from banks that did not receive enforcement actions led EDO banks to expand their lending to minorities. Increased competition could result in greater lending to minority borrowers for two reasons. First, because EDO banks lose deposits and likely face reputational costs, due to the public disclosure of EDOs, they may lose their more profitable customers to competing non-EDO banks, forcing them to expand their reach to new borrowers who previously did not qualify for a loan. Second, because competition erodes excess margins, it increases the cost of discriminating. If banks were previously engaged in taste-based discrimination ([Becker, 1957](#)), they would have had to pay a cost for the utility derived from not lending to specific groups of borrowers. An increase in competition reduces banks' ability to pay this cost, resulting in greater lending to minority borrowers. This argument is consistent with prior work that finds increased competition results in a more equitable distribution of rents ([Ashenfelter & Hannan, 1986](#); [Black & Brainerd, 1999](#); [Black & Strahan, 2001](#)).

To evaluate whether competition from non-EDO banks drives the increase in lending to minorities, we study the impact of market concentration in the deposits and residential mortgage loans market on EDO banks' lending. If, driven by competition from non-EDO banks, EDO banks were to increase their lending to minorities, then the increase should be higher in counties where EDO banks face greater competition for deposits and loans. Accordingly, we reestimate [Equation 6](#), where *Treatment* represents high competition (proxied by a measure of deposit or loan market concentration and is the lowest tercile of the Herfindahl-Hirschman index (HHI) measured in the year prior to the EDO issuance in a given county).

We present the results from this analysis in columns (2) and (3) of [Table 6](#). The coefficient

for *Treatment* indicates that lending to minorities forms a greater share of banks’ lending portfolios in highly competitive counties, supporting the validity of our measures ([Ashenfelter & Hannan, 1986](#); [Black & Brainerd, 1999](#); [Black & Strahan, 2001](#)). However, we do not find that EDO banks in high-competition counties increase lending to minorities more following the termination of the enforcement action, suggesting that an increase in competition from non-EDO banks does not drive our results.

Our results in [Section 5](#) that banks do not witness an increase in the riskiness of loans following EDO termination are also inconsistent with the competition channel. If, driven by a loss of better customers to competitors, EDO banks were to increase lending to less creditworthy customers, the increase should result in higher nonperforming assets or an increase in risky lending. Overall, our results suggest that competition from non-EDO banks is unlikely to drive our findings.

7. Supplemental analyses: lending to women

To further support our hypothesis that EDO banks increase lending to historically marginalized borrowers following termination of enforcement actions, we explore lending to another category of borrowers: women who are primary or solo mortgage borrowers. Similar to our analyses for minority borrowers, we explore whether EDO banks expand their lending to women. Specifically, we reestimate [Equation 1](#) with the dependent variables representing lending to female borrowers.

[Table 7](#) presents the results from this analysis. The dependent variable in column (1) represents lending to women as a share of banks’ portfolio of residential mortgage lending at the bank-county level. Consistent with our results for minority borrowers, EDO banks expand their portfolio share of lending to women by 5.8% following EDO termination. We also find an increase of 3.4% in mortgage lending to women during the time the EDO is in effect. Column (2) of [Table 7](#) shows the market share results. Banks expand lending to women significantly following EDO termination. Relative to the pre-EDO period, market

share in mortgage lending to women increases by 0.67%. The results in [Table 7](#) indicate that, consistent with our results for minority borrowers, EDO banks also expand lending to women who are primary or solo borrowers. These results are consistent with improvements in internal processes as part of the enforcement process driving access to credit for previously underserved categories of borrowers.

8. Conclusion

We study the positive social externalities of bank enforcement actions on mortgage lending markets. Enforcement actions are issued by bank supervisors to discipline problem banks. They can fundamentally improve bank operations by changing the oversight of loan approvals and credit assessment and risk management practices. We focus on banks' borrower bases and find that, after EDO termination, banks significantly increase residential mortgage lending to minorities and increase their market share of lending to this group of borrowers within the counties where they operate.

Further investigation reveals that, following the termination of enforcement actions, banks are less likely to reject loan applications from minority borrowers. This decline in rejections spans the full range of mortgage lending, including loans for home purchases, refinancings, investment properties, and home improvement. When considering specific reasons provided by banks for rejecting a loan, we find that, following EDO termination, banks are less likely to deny a loan application from minorities based on nonprice terms. Banks have used nonprice thresholds, such as credit history, to ration credit, and these thresholds tend to disproportionately constrain lending to minorities ([Bostic, 1997](#); [Gyourko et al., 1999](#); [Acolin et al., 2016](#)). The finding that EDO banks rely less on nonprice terms to approve loan applications from minority borrowers is consistent with the observed increase in lending to this group. Interestingly, our results are significantly stronger in markets with a greater proportion of subprime borrowers—the very borrowers more likely to be constrained by nonprice terms. At the same time, we find no increase in the overall riskiness of EDO banks'

portfolios, suggesting improvements in credit assessment (e.g., using additional sources of information to assess borrower risk rather than just the credit score).

To more clearly tie our results to operational improvements at the bank, we study the textual content of enforcement actions. Our findings of increased lending to minorities are stronger for EDOs that specify revision of loan policies or the implementation of more formal internal governance procedures. Our results are also stronger in regions with a larger proportion of subprime borrowers as well as for banks that are likely to improve more—that is, those with stricter regulators and more severe EDOs. We find no support for the alternative explanations that low capital or competition from non-EDO banks may be driving our results. We also find similar increases in lending to another class of historically underserved borrowers—women who are primary or solo borrowers—consistent with process improvements at EDO banks leading to positive social externalities.

Our study highlights the positive social externalities of bank enforcement actions and bridges the literature on bank supervision and enforcement actions and mortgage lending to minority borrowers. We show that enforcement results in greater access to credit for minority borrowers through improving banks’ internal operations, even when the enforcement action is not issued for violations of fair lending laws. Our work has policy implications. We highlight the importance of process improvements within the bank as a critical factor in enhancing the access to credit for minority borrowers.

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Appendix A. Variable definitions

Variable	Definition	Source	Code
Dependent Variables			
Denial	Indicator variable which takes the value of 1 if a mortgage application is denied by financial institution and 0 otherwise	HMDA	Action Taken = 3
Market shares	Total residential mortgage loans to minorities (women) for EDO banks in a county / Total residential mortgage loans to minorities (women) for all banks in the county	HMDA and authors' calculations	
Portfolio shares	Total residential mortgage loans to minorities (women) / Total residential mortgage loans	HMDA and authors' calculations	
Independent Variables			
Conventional Loans	Indicator variable which takes the value of 1 if loan type is conventional and 0 otherwise. Conventional loans are any loans other than FHA, VA, FSA, or RHS loans	HMDA	Loan Type = 1
During EDO	Indicator variable which takes the value of 1 from the year EDO was issued to the year EDO was terminated and 0 otherwise.	SNL and authors' calculations	
EDO Length	EDO length in years	SNL	
FHA-insured Loans	Indicator variable which takes the value of 1 if loan type is FHA(Federal Housing Administration) -insured loans and 0 otherwise.	HMDA	Loan Type = 2
FSA/RHS Loans	Indicator variable which takes the value of 1 if loan type is FSA/RHS (Farm Service Agency or Rural Housing Service) and 0 otherwise.	HMDA	Loan Type = 4

High Competition	Indicator variable which takes the value of 1 for the lowest deposit or residential mortgage market HHI tercile in a given county and 0 otherwise.	Summary of Deposits	
Home Improvement, Non-Owner occupied	Indicator variable which takes the value of 1 if loan purpose is home improvement and the property is not owner-occupied and 0 otherwise.	HMDA	Loan Purpose = 2 & Owner-Occupancy = 2
Home Improvement, Owner occupied	Indicator variable which takes the value of 1 if loan purpose is home improvement and the property is owner-occupied as a principal dwelling and 0 otherwise.	HMDA	Loan Purpose = 2 & Owner-Occupancy = 1
Home Purchase, Non-Owner occupied	Indicator variable which takes the value of 1 if loan purpose is home purchase and the property is not owner-occupied and 0 otherwise.	HMDA	Loan Purpose = 1 & Owner-Occupancy = 2
Home Purchase, Owner occupied	Indicator variable which takes the value of 1 if loan purpose is home purchase and the property is owner-occupied as a principal dwelling and 0 otherwise.	HMDA	Loan Purpose = 1 & Owner-Occupancy = 1
Low Capital	Indicator variable which takes the value of 1 if an EDO bank is in the lowest tercile of capital ratio in the period prior to receiving an EDO.	Call Reports	RCFD3210 / RCFD2170
Male	Indicator variable which takes the value of 1 if a mortgage applicant is male and 0 otherwise.	HMDA	Sex = 1
Minority	Indicator variable which takes the value of 1 if a mortgage applicant is non-white and 0 otherwise.	HMDA	Race = 1, 2, 3, or 4
Post EDO	Indicator variable which takes the value of 1 for the five years after the EDO was terminated and 0 otherwise.	SNL and authors' calculations	

Refinancing, Non-Owner occupied	Indicator variable which takes the value of 1 if loan purpose is refinancing and the property is not owner-occupied and 0 otherwise.	HMDA	Loan Purpose = 3 & Owner-Occupancy = 2
Refinancing, Owner occupied	Indicator variable which takes the value of 1 if loan purpose is refinancing and the property is owner-occupied as a principal dwelling and 0 otherwise.	HMDA	Loan Purpose = 3 & Owner-Occupancy = 1
Regulatory Strictness	Indicator variable which takes the value of 1 for the lowest regulatory leniency tercile in the year before EDO and 0 otherwise. Regulatory leniency measure of Agarwal et al. (2014) measured as the difference between average regulatory ratings of federal and state regulators.	Agarwal et al. (2014)	
VA-guaranteed Loans	Indicator variable which takes the value of 1 if loan type is VA (Veterans Administration)-guaranteed loans and 0 otherwise.	HMDA	Loan Type = 3
Control Variables			
Capital Ratio	Total equity as a proportion of total assets.	Call Reports	RCFD3210 / RCFD2170
Employment Growth	The growth of employment level (Total employment is defined as the number of jobs)	Bureau of Economic Analysis	(Total Employment - Lagged Total Employment) / Lagged Total Employment
Liquidity Ratio	Ratio of cash and cash equivalents to total assets, where cash is defined as the sum of interest-bearing balances, noninterest bearing balances, and currency and coin.	Call Reports	(RCFD0071 + RCFD0081) / RCFD2170
Nonperforming Assets Ratio (NPA)	The sum of nonaccruing loans and accruing loans past 90 days divided by net total loans.	Call Reports	(RCFD1403 + RCFD1407) / (RCFD1400 - RCFD3123 - RCFD2123)
Return on Assets (ROA)	Net income divided by average total assets	Call Reports	RIAD4340 / RCFD2170
Size	Natural logarithm of total assets	Call Reports	log(RCFD2170)

Table 1: Descriptive statistics

This table presents the summary statistics for the variables we use in our analyses. [Panel A](#) shows bank-level variables using quarterly call report data, and county-bank-level portfolio and market shares using annual HMDA data. [Panel B](#) shows the breakdown of loans originated and applications declined. To mitigate the effects of extreme observations, all continuous variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#).

Panel A: Bank and county-level data

	N	Mean	Std	P1	P25	Median	P75	P99
Bank-Level Variables								
Total loans / Assets	41,015	0.653	0.137	0.259	0.573	0.673	0.753	0.891
C&I loans / Assets	41,015	0.103	0.071	0.001	0.052	0.088	0.137	0.338
Total mortgages / Assets	41,015	0.474	0.173	0.035	0.356	0.491	0.603	0.802
Commercial mortgages / Assets	41,015	0.102	0.086	0.000	0.040	0.081	0.141	0.410
Residential mortgages / Assets	41,015	0.179	0.106	0.004	0.102	0.165	0.237	0.500
Deposits / Assets	41,015	0.837	0.077	0.567	0.804	0.854	0.889	0.939
Total loans / Deposits	41,012	0.786	0.181	0.319	0.676	0.794	0.902	1.225
Size	41,015	11.917	1.268	9.363	11.056	11.825	12.628	15.767
Return on Assets	41,015	0.001	0.011	-0.043	0.000	0.003	0.006	0.022
Liquidity Ratio	41,015	0.067	0.064	0.008	0.027	0.045	0.083	0.328
Capital Ratio	41,015	0.103	0.042	0.036	0.082	0.096	0.114	0.265
Nonperforming Assets Ratio	41,015	0.029	0.034	0.000	0.006	0.017	0.040	0.168
County-Level Variables								
Residential Mortgage Portfolio Shares (of loans to minorities)	162,769	6.542	19.871	0.000	0.000	0.000	0.000	100.000
Residential Mortgage Market Shares (of loans to minorities)	497,594	0.408	3.936	0.000	0.000	0.000	0.000	9.721

Table 1: Descriptive statistics, continued

Panel B: The number of loans originated or denied

	Number of Loans Originated	Number of Applications Denied	% denied
Total	2,772,382	1,414,587	33.8%
Race			
Majority	2,156,439	621,376	22.4%
Minority	264,161	139,329	34.5%
Gender			
Male	1,883,706	567,325	23.1%
Female	632,973	250,883	28.4%
Loan Type			
Conventional	2,401,190	1,330,381	35.7%
FHA-insured	251,607	61,429	19.6%
VA-guaranteed	100,965	18,203	15.3%
FSA/RHS	18,620	4,574	19.7%
Loan Purpose & Owner-occupancy			
Home Purchase: Owner-occupied	885,538	275,244	23.7%
Home Purchase: Not-owner-occupied	233,856	74,891	24.3%
Home Improvement: Owner-occupied	194,062	169,741	46.7%
Home Improvement: Not-owner-occupied	24,440	10,029	29.1%
Refinancing: Owner-occupied	1,244,578	826,978	39.9%
Refinancing: Not-owner-occupied	187,144	57,271	23.4%
Others	2,764	433	13.5%

Table 2: Lending to minorities for EDO banks

This table presents a county-level analysis for EDO banks' portfolio allocation and market shares of residential mortgage lending to minorities. The dependent variable in column (1) is EDO banks' residential mortgage loans to minorities as a share of their total residential mortgage portfolios. In column (2), it is EDO banks' residential mortgage loans to Black or African American borrowers as a share of their total residential mortgage portfolios; whereas in column (3) it is EDO banks' residential mortgage loans to Black or African American borrowers scaled by residential mortgage loans to white males. Columns (4) and (5) analyze changes in EDO banks' market shares at the county level: in column (4), the dependent variable is EDO banks' market shares of residential mortgage loans to minority borrowers; whereas in column (5) it is EDO banks' market share of residential mortgage loans to Black or African American borrowers. The indicator *During EDO* refers to the actual time a bank is subject to an EDO and *Post EDO* is an indicator for years one to five after EDO termination. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). Standard errors are calculated using a bootstrap. The z -statistics are presented in parentheses; $*p < 0.1$; $**p < 0.05$; $***p < 0.01$ (two-tailed).

	Portfolio shares (Minorities)	Portfolio shares (Black or African American)	Portfolio shares (Black or African American relative to white males)	Market shares (Minorities)	Market shares (Black or African American)
	(1)	(2)	(3)	(4)	(5)
During EDO	-1.089* (-1.887)	-0.628 (-0.955)	-2.898*** (-3.236)	-0.054 (-0.990)	-0.115* (-1.903)
Post EDO	2.969*** (4.925)	2.687*** (4.148)	5.034*** (5.587)	1.051*** (12.857)	1.103*** (16.189)
Observations	162,769	162,769	162,769	497,594	430,106
Wald χ^2	312***	619***	980***	663***	5166***
Reg Type	RE Tobit	RE Tobit	RE Tobit	RE Tobit	RE Tobit
Controls	Yes	Yes	Yes	Yes	Yes
Year, County, Bank RE	Yes	Yes	Yes	Yes	Yes
Years	1994–2018	1994–2018	1994–2018	1994–2018	1994–2018

Table 3: Loan denials by EDO banks

This table presents marginal effects for the likelihood of loan application denials by EDO banks, by loan type and reason. [Panel A](#) shows the marginal effects by loan type, whereas [Panel B](#) shows the marginal effects by denial reason. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO* corresponds an indicator variable taking the value of one for the five years after an EDO's termination; *Minority* is an indicator taking the value of one if an application is by a minority borrower. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

Panel A: Denials by loan application type

	No Denial	Denial: Home Purchase, Owner- occupied	Denial: Home Purchase, Not-owner- occupied	Denial: Home Improvement, Owner-occupied	Denial: Home Improvement, Not-owner- occupied	Denial: Refinancing, Owner-occupied	Denial: Refinancing, Not-owner- occupied
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
During EDO	-0.0370* (-1.73)	0.0046 (0.35)	-0.0005 (-0.12)	0.0123*** (3.57)	0.0012*** (3.32)	0.0184** (2.55)	0.0010 (0.77)
Post EDO	-0.1380*** (-7.21)	0.0589*** (5.16)	0.0223*** (9.10)	0.0003 (0.04)	0.0006 (0.97)	0.0466*** (4.93)	0.0094*** (6.77)
Minority	-0.1110*** (-5.56)	0.0401*** (8.65)	0.0086*** (3.92)	0.0265*** (4.38)	0.0027*** (4.94)	0.0295*** (2.99)	0.0036 (1.43)
During EDO \times Minority	-0.0054 (-0.48)	0.0023 (0.37)	0.0006 (0.30)	-0.0032 (-0.52)	0.0003 (1.19)	0.0042 (0.61)	0.0012 (1.00)
Post EDO \times Minority	0.0640** (2.24)	-0.0180** (-2.35)	-0.0073*** (-2.81)	-0.0150** (-2.26)	-0.0009 (-1.34)	-0.0230* (-1.78)	0.0000 (0.01)
Observations	3,102,329						
Pseudo R ²	0.068						
Reg Type	Multinomial						
	Logit						
Controls	Yes						
Year FE	Yes						
Cluster	Bank						
Years	1994–2018						

Table 3: Loan denials by EDO banks, continued

Panel B: Denials by reason type

	No Denial	Denial: Debt to income ratio	Denial: Credit history	Denial: Collateral	Denial: Information	Denial: Other
	(1)	(2)	(3)	(4)	(5)	(6)
During EDO	-0.0388 (-1.61)	-0.0011 (-0.36)	0.0132*** (3.18)	-0.00115 (-0.09)	-0.0120*** (-2.81)	0.0399*** (3.02)
Post EDO	-0.1440*** (-7.60)	0.0108** (2.15)	0.0067 (1.29)	0.0642*** (7.54)	0.0034 (0.61)	0.0588*** (3.72)
Minority	-0.1130*** (-6.93)	0.0081*** (5.81)	0.0227*** (7.06)	0.0060 (1.64)	0.0043** (2.27)	0.0718*** (6.51)
During EDO \times Minority	0.0074 (0.62)	-0.0009 (-0.56)	0.0024 (0.67)	-0.0029 (-0.73)	0.0034*** (3.74)	-0.0096 (-0.93)
Post EDO \times Minority	0.0612** (2.49)	-0.0005 (-0.16)	-0.0086** (-2.16)	-0.0068 (-1.54)	0.0013 (0.50)	-0.0466*** (-3.20)
Observations	3,105,384					
Pseudo R ²	0.091					
Reg Type	Multinomial					
	Logit					
Controls	Yes					
Year FE	Yes					
Cluster	Bank					
Years	1994–2018					

Table 4: Loan portfolio quality for EDO banks

This table presents banks' loan portfolio quality changes during an EDO and after its termination. The dependent variables in [Panel A](#) refer to bank-level nonperforming assets. The dependent variable in [Panel B](#) is risky mortgages (defined as higher-priced closed-end mortgages) as a share of total residential mortgages at the bank-county-level, and in [Panel C](#) is EDO banks' residential mortgage loans to minorities as a share of their total residential mortgage portfolios. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO* corresponds to one to five years after an EDO's termination. All regressions include lagged bank-level control variables (size, profitability, liquidity, and capital ratio) and a county-level macro variable (employment growth). In addition, model (3) of [Panel A](#) includes lagged bank-level NPA scaled by total loans. Column (1) [Panel B](#) includes year, county, and bank random effects; whereas column (2) of [Panel B](#) includes year and bank \times county fixed effects. To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). Standard errors in column (1) of [Panel B](#) and [Panel C](#) are calculated using a bootstrap. The t -statistics for the OLS models and z -statistics for the Tobit models are presented in parentheses; $*p < 0.1$; $**p < 0.05$; $***p < 0.01$ (two-tailed).

Panel A: Nonperforming assets of EDO banks

	Total NPA / Total loans	Total NPA / Total loans	NPA for residential mortgages / Total loans
	(1)	(2)	(3)
During EDO	0.016*** (13.732)	0.011*** (10.743)	-0.001* (-1.929)
Post EDO	0.002 (1.241)	0.002 (1.186)	-0.000 (-0.713)
Observations	41,010	41,010	37,322
Adjusted R ²	0.552	0.612	0.851
Reg Type	OLS	OLS	OLS
Controls	No	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Cluster	Bank	Bank	Bank
Years	1994–2018	1994–2018	2001–2018

Table 4: Loan portfolio quality for EDO banks, continued

Panel B: County-level share of risky lending by EDO banks

	Market shares of risky loans	Market shares of risky loans
	(1)	(2)
During EDO	-2.476*** (-13.754)	-0.157 (-0.244)
Post EDO	-1.702*** (-8.760)	-1.057 (-1.087)
Observations	106,851	24,839
Adjusted R ²		0.588
Wald χ^2	1525***	
Reg Type	RE Tobit	OLS
Controls	Yes	Yes
Year, County, Bank effects	Yes	Yes
Years	2004 - 2018	2004 - 2018

Table 4: Loan portfolio quality for EDO banks, continued

Panel C: Share of securitized loans for EDO banks

	Portfolio shares (Unsecuritized loans)	Portfolio shares (Securitized loans)	Portfolio shares (Securitized sold to non-GSEs)	Portfolio shares (Securitized sold to GSEs)
	(1)	(2)	(3)	(4)
During EDO	-5.356*** (-7.131)	3.228*** (4.373)	6.833*** (7.074)	-0.258 (-0.319)
Post EDO	-3.695*** (-5.199)	8.215*** (10.924)	5.625*** (6.110)	14.930*** (16.596)
Observations	162,769	162,769	162,769	162,769
Wald χ^2	298***	646***	328***	1116***
Reg Type	RE Tobit	RE Tobit	RE Tobit	RE Tobit
Controls	Yes	Yes	Yes	Yes
Year, County, Bank RE	Yes	Yes	Yes	Yes
Years	1994–2018	1994–2018	1994–2018	1994–2018

Table 5: Improvements at EDO banks and loans to minority borrowers

This table presents a county-level analysis for EDO banks' portfolio allocation of residential mortgage lending to minorities. The dependent variable, *Portfolio shares*, is banks' allocation of credit to minorities within their county-level residential loan portfolios; *Treatment* is an indicator variable associated with process improvements at EDO banks. *Subprime share* is the percent of borrowers at the county level with FICO scores of 619 and below. [Panel A](#) shows the impact of requiring a written loan policy (Columns (1)–(2)) and written internal audit procedures (Columns (3)–(4)). In [Panel B](#), Column (1) shows the impact of regulatory strictness (using [Agarwal et al. \(2014\)](#)'s measure), whereas column (2) shows the impact of EDO severity (proxied by EDO length). The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO* is an indicator variable for the five years after an EDO's termination. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). Standard errors are calculated using a bootstrap. The *z*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

Panel A: Loan policy and internal audit

	Treatment = Loan policy	Treatment = Loan policy	Treatment = Internal audit	Treatment = Internal audit
	Portfolio shares	Portfolio shares	Portfolio shares	Portfolio shares
	(1)	(2)	(3)	(4)
During EDO \times Treatment	0.133 (0.106)	3.477* (1.759)	-1.165 (-0.763)	3.739 (1.382)
Post EDO \times Treatment	-0.839 (-0.649)	-1.027 (-0.509)	2.084 (1.330)	-2.613 (-0.966)
During \times Treatment \times Subprime		-20.037 (-1.152)		-95.757*** (-4.354)
Post EDO \times Treatment \times Subprime		71.408*** (4.015)		93.611*** (4.489)
Observations	151,748	151,559	151,748	151,559
Wald χ^2	184***	313***	229***	414***
Reg Type	RE Tobit	RE Tobit	RE Tobit	RE Tobit
Controls	Yes	Yes	Yes	Yes
Year, County, Bank RE	Yes	Yes	Yes	Yes
Years	1994–2018	1994–2018	1994–2018	1994–2018

Table 5: Improvements at EDO banks and loans to minority borrowers, continued

Panel B: Regulatory strictness (state-chartered EDO banks only) and EDO length

	Treatment = Regulatory Strictness	Treatment = EDO Length
	Portfolio shares	Portfolio shares
	(1)	(2)
Treatment	3.529** (2.028)	-1.381*** (-3.673)
During EDO	0.327 (0.321)	-5.781*** (-5.137)
Post EDO	-3.626*** (-3.328)	-4.646*** (-3.764)
During EDO \times Treatment	-2.316 (-1.333)	2.217*** (4.808)
Post EDO \times Treatment	8.531*** (4.314)	3.348*** (6.697)
Observations	77,379	162,769
Wald χ^2	174***	398***
Reg Type	RE Tobit	RE Tobit
Controls	Yes	Yes
Year FE	Yes	Yes
Years	1994–2018	1994–2018

Table 6: Alternative mechanisms: Low capital and local market competition

This table presents changes in EDO banks' residential mortgage loans to minority borrowers. The dependent variable is banks' allocation of credit to minorities within their county-level residential loan portfolios. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO* is an indicator for one to five years after an EDO's termination; *Low capital* is an indicator variable for the banks in the lowest tercile of regulatory capital before an EDO; *High Competition (deposits)* corresponds to the lowest deposit market HHI tercile in a given county; and *High Competition (loans)* corresponds to the lowest residential mortgage loan market HHI tercile in a given county. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). Standard errors are calculated using a bootstrap. The z -statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

	Treatment=Low capital	Treatment=High competition (deposits)	Treatment=High competition (loans)
	Portfolio shares	Portfolio shares	Portfolio shares
	(1)	(2)	(3)
Treatment	9.726*** (8.672)	19.411*** (16.680)	27.481*** (20.274)
During EDO	-0.518 (-0.647)	-2.209** (-2.285)	-1.177 (-1.116)
Post EDO	1.765** (2.294)	2.406** (2.218)	3.789*** (3.459)
During EDO x Treatment	-0.065 (-0.060)	1.888 (1.615)	0.269 (0.223)
Post EDO x Treatment	0.255 (0.208)	1.076 (0.786)	-0.766 (-0.582)
Observations	156,913	156,808	156,874
Wald Chisq	334***	908***	1084***
Estimation method	RE Tobit	RE Tobit	RE Tobit
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Years	1994–2018	1994–2018	1994–2018

Table 7: Supplemental analysis: EDO banks' loans to women

This table presents county-level analysis of EDO banks' portfolio allocation and market shares of lending to women. Column (1) shows EDO banks' allocation of credit to women within their county-level residential loan portfolios; whereas column (2) shows EDO banks' county-level market shares of residential mortgage lending to women. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO* is an indicator for one to five years after an EDO's termination. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio and NPA), and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). Standard errors are calculated using a bootstrap. The z-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

	Portfolio shares (Women)	Market shares (Women)
	(1)	(2)
During EDO	3.401*** (5.998)	0.042 (1.539)
Post EDO	5.805*** (10.855)	0.674*** (23.008)
Observations	162,769	529,238
Wald χ^2	796***	11197***
Reg Type	RE Tobit	RE Tobit
Controls	Yes	Yes
Year, County, Bank RE	Yes	Yes
Years	1994–2018	1994–2018

Appendix B. Online Appendix to “Social Externalities of Bank Enforcement Actions: The Case of Minority Lending”

Appendix B.1. Additional Tables

Table OA1: Number of counties with lending to minorities

This table presents a county-level analysis for the number of counties covered by EDO banks in which they lend to minorities. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Pre EDO (year)* and *Post EDO (year)* correspond to indicator variables for the years before an EDO and after EDO termination.

	Average number of distinct counties where EDO banks are active (per bank)	Average number of distinct counties where EDO banks lend to minorities (per bank)	Of which: minority population greater than 50% of county population
	(1)	(2)	(3)
Pre EDO (year -3)	22	6	3
Pre EDO (year -2)	22	7	3
Pre EDO (year -1)	22	7	3
During EDO (annualized, on average)	21	6	3
Post EDO (year 1)	25	8	3
Post EDO (year 2)	27	9	3
Post EDO (year 3)	29	9	4
Post EDO (year 4)	31	10	4
Post EDO (year 5)	31	11	4

Table OA2: Robustness: Lending to minorities by EDO banks (county population-weighted estimation)

This table presents a county-level analysis for EDO banks' market shares of residential mortgage lending to minorities. The dependent variable is EDO banks' county-level market shares of residential mortgage loans to minorities. In column (1), the bank-county-level regressions are weighted by the natural logarithm of county population; whereas in column (2), the regressions are weighted by the county's share of total U.S. population. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; whereas *Post EDO* corresponds to indicator variables for the one to five years after EDO termination. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#) of the manuscript. The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

	Market shares	Market shares
	(1)	(2)
During EDO	-0.026** (-2.109)	-0.026 (-0.612)
Post EDO	0.979*** (87.381)	0.407*** (10.342)
Observations	489,709	489,709
Wald χ^2	106165***	2005***
Reg Type	RE Tobit	RE Tobit
Controls	Yes	Yes
Year, County, Bank RE	Yes	Yes
Years	1994-2018	1994-2018

Table OA3: Matched sample analysis: Lending to minorities by EDO banks

This table presents county-level analysis of banks' portfolio shares of residential mortgage loans to minorities using a control sample of non-EDO banks, matched on size and geography (county). The dependent variable is banks' residential mortgage loans to minorities as a share of their total residential mortgage portfolios. *Treatment* is an indicator variable that takes a value of 1 for EDO banks and 0 otherwise. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; and *Post EDO* is an indicator variable for the five years after an EDO's termination. The regression includes lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). Standard errors are calculated using a bootstrap. The z -statistics are presented in parentheses; $*p < 0.1$; $**p < 0.05$; $***p < 0.01$ (two-tailed).

	Portfolio shares
	(1)
During EDO	-0.037 (-0.071)
Post EDO	-0.146 (-0.288)
During EDO \times Treatment	-0.051 (-0.069)
Post EDO \times Treatment	1.429** (2.012)
Observations	316,133
Wald χ^2	1230***
Estimation method	RE Tobit
Controls	Yes
Year, Bank, County RE	Yes
Years	1994 - 2018

Table OA4: Loan denials by EDO banks (linear probability model)

This table presents coefficient estimates from a linear probability model for the reasons EDO banks give when they deny a loan application. The dependent variables in columns (1)–(9) are indicators for the reason for denial, conditional on a loan application being denied. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO* corresponds an indicator variable taking the value of one for the five years after an EDO's termination; *Minority* is an indicator taking the value of one if an application is by a minority borrower. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

	Denial: Debt to income	Denial: Employment history	Denial: Credit history	Denial: Collateral	Denial: Insufficient cash	Denial: Unverifiable information	Denial: Incomplete application	Denial: Mortgage insurance denied	Denial: Unspecified
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
During EDO	-0.008 (-0.366)	-0.003 (-1.125)	0.018 (0.951)	-0.018 (-1.011)	-0.006** (-1.975)	-0.022* (-1.804)	0.016 (0.876)	0.003 (1.409)	0.003 (0.089)
After EDO	0.018 (0.481)	-0.006 (-1.275)	0.014 (0.577)	0.031 (0.841)	-0.000 (-0.068)	-0.008 (-0.777)	0.001 (0.030)	0.002 (1.190)	-0.064* (-1.779)
Minority \times During EDO	-0.003 (-0.340)	-0.002 (-0.833)	-0.001 (-0.103)	-0.028 (-1.482)	-0.000 (-0.052)	0.001 (0.279)	0.019 (1.360)	-0.001 (-0.723)	0.017 (1.173)
Minority \times After EDO	0.011 (1.019)	0.000 (0.175)	-0.034*** (-3.104)	-0.005 (-0.215)	-0.006** (-2.135)	0.004 (1.501)	0.015** (2.227)	0.000 (0.089)	0.004 (0.417)
Observations	629,789	629,789	629,789	629,789	629,789	629,789	629,789	629,789	629,789
Adjusted R ²	0.134	0.052	0.357	0.151	0.026	0.035	0.340	0.031	0.303
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank \times County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Years	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018

Table OA5: Loan denials by EDO banks (interaction with subprime)

This table presents coefficient estimates from a linear probability model for the reasons EDO banks give when they deny a loan application. The dependent variables in columns (1)–(9) are indicators for the reason for denial, conditional on a loan application being denied. The indicator *During EDO* refers to the actual time a bank is subject to an EDO; *Post EDO* corresponds an indicator variable taking the value of one for the five years after an EDO's termination; *Minority* is an indicator taking the value of one if an application is by a minority borrower; *Subprime* is an indicator taking a value of one if the average transaction-matched FICO score at level of the census tract, loan origination year, loan type, loan purpose, and occupancy status of the property, is 619 or below. All regressions include lagged bank-level control variables (size, profitability, liquidity, capital ratio, and NPA) and a county-level macro variable (employment growth). To mitigate the effects of extreme observations, all continuous bank-level variables are winsorized at the 1% and 99% tails of their respective distributions in each sample year. All variables are defined in [Appendix A](#). The *t*-statistics are presented in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed).

	Denial: Debt to income	Denial: Employment history	Denial: Credit history	Denial: Collateral	Denial: Insufficient cash	Denial: Unverifiable information	Denial: Incomplete application	Denial: Mortgage insurance denied	Denial: Unspecified
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
During EDO \times Minority	-0.010* (-1.829)	-0.002 (-0.918)	-0.002 (-0.193)	-0.010 (-1.469)	-0.001 (-0.308)	-0.001 (-0.397)	0.024 (1.522)	-0.001 (-0.694)	0.016 (1.035)
Post EDO \times Minority	0.001 (0.092)	-0.001 (-0.886)	-0.031*** (-3.066)	0.020** (2.349)	-0.008*** (-3.589)	0.002 (0.772)	0.018** (2.582)	-0.000 (-0.104)	0.001 (0.116)
During EDO \times Minority \times Subprime	-0.013 (-0.527)	-0.001 (-0.119)	-0.059*** (-2.875)	0.025 (1.008)	0.020 (1.024)	-0.005 (-0.411)	0.000 (0.008)	0.002 (1.215)	0.018 (0.574)
Post EDO \times Minority \times Subprime	-0.010 (-0.437)	0.003 (0.351)	0.023 (0.968)	-0.054** (-2.358)	0.003 (0.391)	-0.018*** (-2.945)	-0.012 (-1.368)	-0.001 (-0.435)	0.056** (2.209)
Observations	571,655	571,655	571,655	571,655	571,655	571,655	571,655	571,655	571,655
Adjusted R ²	0.133	0.0568	0.321	0.150	0.0271	0.0332	0.342	0.0320	0.302
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank \times County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Years	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018	1994-2018

Appendix B.2. Excerpts from an enforcement order requiring changes to internal audit and loan policy

**In the Matter of
HAMPTON BANK
HAMPTON, MINNESOTA
(Insured State Nonmember Bank)
ORDER TO CEASE AND DESIST
FDIC-97-43b**

Hampton Bank, Hampton, Minnesota ("Bank"), having been advised of its right to a Notice of Charges and of Hearing detailing the unsafe or unsound banking practices and violations of law and/or regulations alleged to have been committed by the Bank and of its right to a hearing on such alleged charges under section 8(b) of the Federal Deposit Insurance Act ("Act"), 12 U.S.C. § 1818(b), and having waived those rights, entered into a STIPULATION AND CONSENT TO THE ISSUANCE OF AN ORDER TO CEASE AND DESIST ("CONSENT AGREEMENT") with counsel for the Federal Deposit Insurance Corporation ("FDIC"), dated ____, 1997, whereby solely for the purpose of this proceeding and without admitting or denying any unsafe or unsound banking practices or violations of law and/or regulations, the Bank consented to the issuance of an ORDER TO CEASE AND DESIST ("ORDER") by the FDIC.

The FDIC considered the matter and determined that it had reason to believe that the Bank had engaged in unsafe or unsound banking practices and had violated laws and/or regulations. The FDIC, therefore, accepted the CONSENT AGREEMENT and issued the following:

[.14] 14. (a) No more than 30 days from the effective date of this ORDER, the Bank shall develop a written internal audit procedure to improve internal controls, accounting practices and recording. The procedure shall require, at a minimum:

- (i) a determination that the records of the {{12-31-97 p.C-4414}} Bank are complete and adequate, and that transactions are promptly and properly recorded in the accounts;
- (ii) a check for compliance with applicable statutes and regulations;
- (iii) a review for compliance with policies prescribed by management and/or the board of directors, including verification that loans and securities have been properly approved;
- (iv) a review of electronic data processing procedures and controls, as well as reviewing source documents to ensure that sensitive customer master file change requests have supervisory approval;
- (v) an appraisal of the performance of personnel in accomplishing assigned internal control functions and responsibilities, including tracing transactions to final disposition to ensure there are adequate audit trails;
- (vi) an appraisal of the policies and practices for wire transfer activities including dual controls, segregation of duties, and internal audit coverage;
- (vii) the preparation of a proper and complete set of working papers covering each audit; and
- (viii) the establishment and maintenance of an operating manual describing the specific procedures and techniques to be used by the auditor or auditing staff in performing the audit function.

[.8] 8. No more than 30 days from the effective date of this ORDER, the Bank shall revise its written loan policies which revision shall include, among other things, provisions to address the deficiencies described on pages 8.4 through 8.7 of the FDIC's Report of Examination of the Bank as of January 13, 1997. The revised written loan policies and any subsequent modification thereto shall be submitted to the Regional Director and the Minnesota Commissioner of Commerce for review and comment. No more than 30 days after the receipt of any comment from the Regional Director, the board of directors shall approve the written loan policies and/or any subsequent modification thereto which approval shall be recorded in the minutes of the board of directors. Thereafter, the Bank and its institution-affiliated parties shall follow the written loan policies and/or subsequent modification thereto.

[.9] 9. (a) Within 60 days from the date of this ORDER, the Bank shall establish an internal loan review and grading system ("System") to periodically identify, categorize, and monitor the Bank's potential problem extensions of credit. At a minimum, the System shall provide for:

- (i) assessing the overall quality of the Bank's portfolio of extensions of credit;
- (ii) the identification and amount of each delinquent extension of credit;
- (iii) (A) the identification of each extension of credit warranting the special attention of Bank management, and (B) a statement of the amount and the reason(s) why each extension of credit so identified merits special attention;
- (iv) credit and collateral documentation exceptions;
- (v) the identification and status of each extension of credit in violation of law, rules and regulations;
- (vi) the identification of each extension of credit not in conformity with the Bank's written lending policy, and any exception to such policy; and
- (vii) the identification of each extension of credit to any institution-affiliated party.